



## EPA Region 7 TMDL Review

<b>TMDL ID</b>	319	<b>Water Body ID</b>	Wolf Cr. 10
<b>Water Body Name</b>	Wolf Creek		
<b>Pollutant</b>	Selenium		
<b>Tributary</b>	WQLS: Blue Stem Cr. 33, E. Fk. Wolf Cr. 11, W. Fk. Wolf Cr. 12, Fourmile Cr. 30, Coon Cr. 31.		
<b>State</b>	KS	<b>HUC</b>	10260010
<b>Basin</b>	Smoky Hill/Saline		
<b>Submittal Date</b>	07/09/2004		
<b>Approved</b>	approved		

### Submittal Letter

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

A letter was received by EPA on July 9, 2004, formally submitting this TMDL document for approval under Section 303(d); a revision to this TMDL was received July 29, 2004.

### Water Quality Standards Attainment

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

The ultimate endpoint in this phased TMDL is attainment of the aquatic life use using the 5 µg/L standard in support of chronic aquatic life and 20 ug/L for acute aquatic life support (K.A.R.28-16-28e(c)(2)(F)(ii)). The 5 ug/L criterion is currently attainable at flows exceeded more than 60% of the time. However, due to natural, high background concentrations of selenium at higher flows, a provisional endpoint of 7 µg/L has been set for flows exceeded less than 60% of the time. Attainment of the acute aquatic life criterion of 20 ug/L may not be attainable at higher flows given the naturally occurring background load which occurs during runoff events, elevating concentrations of selenium in the receiving waters.

**Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

The water quality standards, beneficial uses and numeric criteria are described. The target is the chronic aquatic life numeric criterion for selenium, 5 ug/L.

**Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

The target is the numeric criterion and the link between the target and the selenium is direct.

**Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

The main natural source of the selenium is due to the weathering of upper Cretaceous bedrock that underlies the drainage basin. The data suggest that the high selenium concentrations only occur when there is enough rainfall to cause flow through the soils and shallow weathered bedrock of the upland areas of the watershed. When there is little or no drainage from the uplands, the baseflow reflects the lower selenium concentrations expected from ground water discharging from the Dakota and alluvial aquifers.

Land use changes in the watershed such as terracing, and changes in phreatophyte species and density may have affected the selenium concentration by increasing evapotranspiration consumption of water, leaving the residual dissolved solids, including selenium, in a smaller water volume. The one NPDES permitted facility that discharges does contribute to the selenium load, however, this contribution is very minor compared to the perturbations that have consumed water historically and currently in the basin. All significant sources have been considered.

**Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

The allocation is expressed as a TMDL load duration curve in lbs per day (#/day) of selenium, which is derived from the numeric criterion of 5 ug/L and the flow curve. The allocation is a function of the flow, that is, the TMDL represents a continuum of desired

loads over all flow conditions, rather than fixed at a single value. A load curve was established for both the chronic and acute aquatic life criteria.

#### **WLA Comment**

The WLA is identified as 0.0036 #/day for the Lucas MWTP which corresponds to an end-of-pipe concentration of 5 ug/L selenium. The non-discharging permitted facility has a WLA of zero.

#### **LA Comment**

At flows exceeded 60-99% of the time, the load allocation established at the criterion of 5 ug/L ranges from 0.18 to 0.0019 #/day. The criterion transitions between 5 to 7 ug/L within the flow range of 50-60% exceedence. The load allocation between median flow (50%) and the high flow (1%), corresponding to a background concentration of 7 ug/L is 0.38 to 35.7 #/day.

#### **Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The MOS is implicit by the lack of evidence implicating anthropogenic sources of selenium contributing to the impairment. The MWTP discharge is low in volume and there are no impairments at low flows. There is no irrigation in the watershed to load or concentrate selenium in the receiving waters. A background concentration will be derived to replace the default selenium chronic criteria through the water quality standard revision process, and the MOS is established through the revised criteria.

#### **Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

Seasonal variation has been incorporated in the TMDL through the TMDL load curve which accounts for all seasonal flow conditions and the documentation of the seasonal consistency of elevated selenium levels.

#### **Public Participation**

*Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

Public meetings were held on January 7 and March 5, 2003 in Hays to discuss this particular TMDL and others in the Smoky Hill/Saline basin. An internet web site also housed information for the public to access. A public hearing, held in Hays, was conducted on June 2, 2003 to discuss the basin TMDLs; the Smoky Hill/Saline Basin Advisory Committee met to discuss the TMDLs in the basin on October 3, 2002, and January 7, March 3, and June 2, 2003.

#### **Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

KDHE will continue to monitor the rotational station near Sylvan Grove. Priority status will be evaluated in 2008 including application of numeric criteria based on background concentrations. Monitoring of selenium levels in effluent will be a condition of NPDES and state permits for facilities.

#### **Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

Reasonable assurance, although not required for these TMDLs due to the minimal contribution from the point source, includes numerous authorities and funding through the Kansas Water Plan.

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